Recent Trends of Open Publication and Policy Development for Open Science toward Inter-Disciplinary Data Sharing & Publication

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Summary. Open Science movement has been leveraged by Openness and Connectivity with ICT, aiming significant change of scholarship itself. Under this background, Open Science Policy has been developed including Japan, and current mission of Open Science is how to implement FAIR Data Science with data management policy, approved data repositories and research data infrastructures. On the other hand, this movement have developed some new styles of publication of articles such as using preprint server or publication platform by funding agencies. The key issue across the movement is reliability with standardization among researchers at first. As standardized process of publication with incentive models have organized robust and inter-disciplinal system "journal publishing" for researches for long years, standardized format for data must enhance data-sharing, interoperability, and sustainability, which already have been observed partially such as CIF and IIIF in natural science and humanities.

Keywords. Open Science, Open Publication, FAIR principles, standardized format, reliability.

1. Introduction

Open Science is one of important emerging issues around Science, Technology and Innovation Policy. There is still no definition of Open Science in general so far, and there have been many ways to implement it such as Open Access, Open (Research) Data, Citizen Science and so on.

In any ways, Open Science movement has been leveraged by Openness and Connectivity with ICT (Information and Communication Technology), aiming significant change of scholarship itself. [1] Especially EC sets Open Science in Horizon 2020 as one of important issues in Digital Single Market, and G7 Science and Technology Minister Meeting has had continuous discussion to make Open Science reality from 2013. The latest G7 SCIENCE MINISTERS' COMMUNIQUÉ says that "We recognize that ICT developments, the digitisation and the vast availability of data, efforts to push the science frontiers, and the need to address complex economic and societal challenges, are transforming the way in which science is performed towards Open Science paradigms." [2]

2. Open Science and FAIR Data Science

Under this background, Open Science Policy has been developed including Japan. The 5th Science and Technology Basic Plan sets an agenda of "Promotion of Open Science" in 2016. According to the report of the Cabinet Office for Open Science in 2015 [3], the outcomes of publicly funded research, such as published results and underlying data, should be accessible, unless they interfere with personal privacy, national security or direct commercial interests. All other countries have similar policies and they all are keen to research data-sharing.

Current mission of Open Science is how to implement FAIR Data Science. FAIR Data means Findable, Accessible, Interoperable, and Reusable Data.[4] In order to make research data FAIR, they focus on data management plan (DMP),

approved data repositories and research data infrastructures. Especially DMP is a catalyst to make stakeholders recognize the value of research data with their practical management of data. It is expected that accumulation of DMP would be a trigger to lead Open Science and innovation.

However, no one could have a confident vision of extreme data sharing world, which is supposed to develop with fostering a new culture of research for a long time.

3. New styles of publication of articles enhanced by potential of Openness

On the other hand, this movement with openness and connectivity have developed some new styles of publication of articles. [5]

Combination of posting draft articles on preprint server and publishing them on peer review Journal afterwards like arXive and Journals in Physics has been recognized as a good practice of exploiting openness. This combination has been challenged in other research fields recently. Furthermore, some domains such as Information Technology like deep learning only use preprint server because the time cycle of research is too short to conduct normal peer review.

Open Publication Platform by non governmental funding agency such as Wellcome Trust might change the way of publishing drastically because once funding agencies have their open publishing platform, publishers and libraries are no longer on the dissemination process in publication. These examples are so called incremental methods to make research outputs open focusing on articles, but it is reliable along with established publishing process.

4. Reliability and Standardization for Research

The key issue across the movement is reliability with standardization among researchers at first. Standardized process of publication with incentive models have organized robust and inter-disciplinal system "journal publishing" for researches for a long time. In addition, journal article is definitely one of interoperable standardized format of research data and it has played a significant role in research activity.

Also, standardized format for data must enhance data-sharing, interoperability, and sustainability, which already have been observed partially such as CIF (Crystallographic Information File) format in Chemistry Data and IIIF (International Image Interoperability Framework) format for image files in humanities. Accumulating those standardized data format would help develop a new inter-disciplinary framework of interoperable data sharing world.

5. Conclusions

All activities related Open Science should have been on the reliability among stakeholders and we could use properly both of established reliable publication process or emerging standardization of data format.

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